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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/815,543	03/31/2004	Todd O. Yeates	UCLA-135CIP	7172

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EXAMINER	
ROBINSON, HOPE A	

ART UNIT	PAPER NUMBER
1652	

MAIL DATE	DELIVERY MODE
10/31/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/815,543	YEATES ET AL.	
	Examiner	Art Unit	
	Hope A. Robinson	1652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 August 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) *17-25* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16 and 26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/23/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☒ Other: *Notice to Comply*.

DETAILED ACTION

Application Status

1. Applicant's election with traverse of Group I (claims 1-16 and 26) on August 27, 2007 is acknowledged.

2. The traversal is on the grounds that there is no undue burden of search thus all claims should be searched in their entirety. This argument is not persuasive because the mere fact that the claimed invention has acquired a separate status in the art as exemplified by the different classification establishes burden of search. Furthermore, burden of search is only one criteria. MPEP chapter 800 sets forth that a restriction requirement is proper if the claimed invention is independent and or distinct. Thus, the restriction requirement is deemed proper and is final.

Claim Disposition

3. Claims 1-26 are pending. Claims 1-16 and 26 are under examination. Claims 17-25 are withdrawn from further consideration pursuant to 37 CFR 1.12(b), as being drawn to a non-elected invention, there being no allowable generic or linking claim.

Specification

4. The specification is objected to because of the following informalities:

The specification is objected to because trademarks are disclosed throughout the instant specification and not all of them are capitalized or accompanied by the generic terminology. The use of the trademarks such as GENBANK™, for example, have been noted in this application (see page 6). It should be capitalized wherever it appears and be accompanied by the generic terminology. Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner, which might adversely affect their validity as trademarks.

The specification is objected to for the following typographical errors: on page 1, line 13 "awared"; page 5, line 15, "physiological"; page 5, line 27; "ina".

The specification is objected to because on page 6 the organism name is not italicized, see E. coli.

For consistency it is suggested that the specification and claims are amended to read "axis" (see paragraphs 0010 and 0024 for example) or "axes" (see paragraphs 0010, 0027 and 0042 for example), instead of both.

Correction is required.

Drawing

5. The drawings filed on March 31, 2004 is accepted by the examiner.

Sequence Compliance

6. This application contains sequence disclosures that are encompassed by the definitions for nucleotide and/or amino acid sequences set forth in 37 CFR 1.821(a)(1) and (a)(2). However,

this application fails to comply with the requirements of 37 CFR1.821 through 1.825; applicant's attention is directed to the final rule making notice published at 55 FR 18230 (May 1, 1990), and 1114 OG 29 (May 15, 1990). To be in compliance, applicant is required to identify all amino acid sequences of at least 4 L-amino acids and at least 10 nucleotides by a sequence identifier, i.e., "SEQ ID NO:". The specification discloses the sequence "DPVPV that has not been identified by a sequence identifier, see for example, page 14. If these sequences have not been disclosed in the computer readable form of the sequence listing and the paper copy thereof, applicant must provide a computer readable form of the "Sequence Listing" including these sequences, a paper copy of the "Sequence Listing", as well as an amendment directing its entry into the specification, and a statement that the content of the paper and computer readable form copies are the same and, where applicable, include no new matter as required by 37 CFR 1.821(e) or 1.821(f) or 1.821(g) or 1.821(b) or 1.825(d). See the attached Notice to Comply with the sequence rules. Applicant is advised to check the entire specification.

Information Disclosure Statement

7. The Information Disclosure Statement filed on August 23, 2004 has been received and entered. The references cited on the PTO-1449 Form have been considered by the examiner and a copy is attached to the instant Office action.

Claim Objection

8. Claims 6-7 and 11-12 are objected to because of the following informalities:

Claims 6-7 and 11-12 are objected to for the recitation "wherien", instead of "wherein". Correction of the above and compliance with the sequence rules is required.

Claim Rejections - 35 USC э 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. Claims 1-16 and 26 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a fusion protein having dimeric or tetrameric structures from the influenza virus, for example, does not reasonably provide enablement for any fusion protein having a tetrameric or dimeric structure (any oligomerization domain)of any naturally occurring protein. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. The enablement requirement refers to the requirement that the specification describe how to make and how to use the invention. There are many factors to be considered when determining whether there is sufficient evidence to support a determination that a disclosure does not satisfy the enablement requirement and whether any necessary experimentation is undue. These factors include, but are not limited to: Quantity of Experimentation Necessary; Amount of direction or guidance presented; Presence or absence of

working examples; Nature of the Invention; State of the prior art and Relative skill of those in the art; Predictability or unpredictability of the art and Breadth of the claims (see *In re Wands, 858 F.2d at 737, 8 USPQ2d at1404 (Fed. Cir. 1988)*. The factors most relevant to the instant invention are discussed below.

The amount of experimentation required to practice the claimed invention is undue as the claims encompass any naturally occurring or unnaturally occurring protein oligomerization domain (structures capable of forming dimeric or tetrameric structures) of any length that naturally or unnaturally occurs from any protein source. The instant specification on page 6 indicates the claimed invention includes but is not limited to "orange carotenoid protein from A. maxima, MI matrix protein from influenza virus and the like". The specification also discloses that tetrameric structures would include but is not limited to "neuraminidase from influenza virus and *E. coli* fuculose aldolase" (page 6).

Therefore, the claims encompass a large genus fusion proteins and due to the large quantity of experimentation necessary to generate the infinite number of fusion proteins recited in the claims and possibly screen same for activity (of sell assembly) and the lack of guidance/direction provided in the instant specification, this is merely an invitation to the skilled artisan to use the current invention as a starting point for further experimentation. Thus, undue experimentation would be required for a skilled artisan to make and/or use the claimed invention commensurate in scope with the claims.

Predictability of which of finding structures with defined and predictable geometry to enable the oligomeric domains to self assemble. The art recognizes that the influenza virus is a good model for fusion proteins as indicated in the instant specification, however, the claims are

not limited to that specific one. The claims broadly read on any protein from any source. Which renders the claimed invention as unpredictable.

The instant specification on page 14 provides one working example, however, the claims broadly read on any fusion protein possessing a dimeric or tetrameric structure. The art recognizes that proteins have varying structures and configuration and that structural changes affects the protein's ability to function. For example, various sites or regions directly involved in binding activity and providing the correct three-dimensional spatial orientation of binding and active sites can be affected (see Wells, Biochemistry, vol. 29, pages 8509-8517, 1990). The instant specification is not commensurate in scope with the claims, which reads on any protein that can fuse essentially with itself.

The state of the prior art provides evidence for the high degree of unpredictability as stated above. The specification lacks adequate guidance/direction to enable a skilled artisan to practice the claimed invention commensurate in scope with the claims as the claims encompass any or all fusion proteins. The working example provided does not rectify the missing information in the instant specification pertaining to the claimed fusion protein. The nature and properties of this claim is difficult to ascertain from the examples provided as one of skill in the art would have to engage in undue experimentation to construct the enormous amount of fusion proteins encompassed in the claims.

The specification does not provide support for the broad scope of the claims. The issue in this case is the breath of the claims in light of the predictability of the art as determined by the number of working examples, the skill level artisan and the guidance presented in the instant specification and the prior art of record. This make and test position is inconsistent with the

decisions of *In re Fisher, 427 F.2d 833, 839, 166 USPQ 18, 24 (CCPA 1970)* where it is stated that "...scope of claims must bear a reasonable correlation to scope of enablement provided by the specification to persons of ordinary skill in the art...". Without sufficient guidance, determination of having the desired biological characteristics is unpredictable and the experimentation left to those skilled in the art is unnecessarily and improperly extensive and undue. See *In re Wands, 858 F.2d at 737, 8 USPQ2d at 1404 (Fed. Cir. 1988)*. Thus, for all these reasons, the specification is not considered to be enabling for one skilled in the art to make and use the claimed invention as the amount of experimentation required is undue, due to the broad scope of the claims, the lack of guidance and working examples provided in the specification and the high degree of unpredictability as evidenced by the state of the prior art, attempting to construct and test all possible oligomeric domains for self assembly, the claimed invention would constitute undue experimentation.

Claim Rejections - 35 U.S.C. § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this

subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 1-4 and 26 are rejected under 35 U.S.C. 102(e) as being anticipated by Goldberg (U.S. Patent No. 5,877,279, October 13, 1994).

Goldberg teaches a fusion protein that contains two domains (column 1, lines 66-67) rigidly linked to each other (column 1, line 67- column 2, line 2) wherein said fusion protein is capable of self-assembling with additional fusion proteins to produce a regular structure and that the proteins are homodimeric (claim 1, column 1 lines 17-25 and line 54). Goldberg teaches that the two oligomerization domains are derived from naturally occurring proteins (column 1, lines 55-57). The reference teaches that the two naturally occurring proteins are proteins that associate into larger assemblies based on dimeric or trimer building blocks (column 12, lines 51-58). The reference further teaches that the two oligomerization domains are rigidly linked to each other by a linking group (column 3, lines 58-60). It is reported that the regular structure is a two dimensional structure (column 3, lines 17-20) and that the regular structure is produced by the self-assembly of a plurality of fusion proteins (column 3, lines 17-24). In addition, the reference teaches that the structure is homogeneous and heterogeneous with respect to its fusion protein components (column 16, lines 25-62 and line 66-column 18, line 22). Goldberg also teach that the oligomerization domain of the fusion protein is a protein component capable of self-assembling with two or more copies of itself (column 16, line 66-colunm 18, line 22). Goldberg further teaches that the regular structure comprises 12 or more copies of said fusion protein arranged in a symmetrical fashion (column 17, line 18-column 18-, line 24) and that a regular structure is produced by the self-assembly of a plurality of fusion proteins (column 17, line 18-column 18, line 24). Therefore, the limitations of the claims are met by the reference.

Basis For NonStatutory Double Patenting

11. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

12. Claims 1-16 and 26 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-17 and 22-27 of U.S. Patent No. 6,756,039. An obvious-type double patenting rejection is appropriate where the conflicting claims are not identical, but an examined application claim is not patentably distinct from the reference claim(s) because the examined claim is either anticipated by, or would have been obvious over, the reference claim(s). *See In re Berg, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); In re*

Goodman, 11F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); and In re Longi, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985). Although the conflicting claims are not identical, they are not patentably distinct from each other.

The instant application claim is directed to a fusion protein comprising a first oligomerization domain that naturally associates into homodimeric structures and a second oligomerization domain that naturally associates into homotetrameric structures, wherein said first and second oligomerization domains are rigidly linked to each other. The patented claims are directed to a fusion protein of at least two oligomerization domains comprising a first oligomerization domain that naturally associates into homodimeric structures and a second oligomerization domain that naturally associates into homotetrameric structures, rigidly linked to each other, wherein said fusion protein is capable of self assembling with additional fusion proteins to produce a regular structure. The two sets of claims differ as the patented claims recite that the structure self assembles into a regular structure. However, the instant claims encompasses this because limitation in dependent claims (see claim 26 of the instant application) and the disclosure. Although the instant application and the patented claims differ the two sets of claims are obvious variations of each other as the instant claims recites a species of the genus in the patented claims.

Although the scope of the claims herein differs, the two sets of claims are directed to similar inventions as the claim language has the same material. One of ordinary skill in the art would be motivated to modify the patented claims to recite, for example the species contained in the instant claims and as disclosed in the disclosure of the patent because it clarifies the claim by providing the specific species. Thus, the patented claims are an obvious variation of the instant

application claim, therefore *prima facie* obvious.

Conclusion

13. No claims are presently allowable.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hope A. Robinson whose telephone number is 571-272-0957. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ponnathapu Achutamurthy, can be reached at (571) 272-0928. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Hope Robinson, MS HR
Primary Examiner 10/29/07

HOPE ROBINSON
PRIMARY EXAMINER

Application No.: 10/815,543

NOTICE TO COMPLY WITH REQUIREMENTS FOR PATENT APPLICATIONS CONTAINING NUCLEOTIDE SEQUENCE AND/OR AMINO ACID SEQUENCE DISCLOSURES

Applicant must file the items indicated below within the time period set the Office action to which the Notice is attached to avoid abandonment under 35 U.S.C. § 133 (extensions of time may be obtained under the provisions of 37 CFR 1.136(a)).

The nucleotide and/or amino acid sequence disclosure contained in this application does not comply with the requirements for such a disclosure as set forth in 37 C.F.R. 1.821 - 1.825 for the following reason(s):

[x] 1. This application clearly fails to comply with the requirements of 37 C.F.R. 1.821-1.825. Applicant's attention is directed to the final rulemaking notice published at 55 FR 18230 (May 1, 1990), and 1114 OG 29 (May 15, 1990). If the effective filing date is on or after July 1, 1998, see the final rulemaking notice published at 63 FR 29620 (June 1, 1998) and 1211 OG 82 (June 23, 1998).

[ ] 2. This application does not contain, as a separate part of the disclosure on paper copy, a "Sequence Listing" as required by 37 C.F.R. 1.821(c).

[ ] 3. A copy of the "Sequence Listing" in computer readable form has not been submitted as required by 37 C.F.R. 1.821(e).

[x] 4. A copy of the "Sequence Listing" in computer readable form has been submitted. However, the content of the computer readable form does not comply with the requirements of 37 C.F.R. 1.822 and/or 1.823, as indicated on the attached copy of the marked -up "Raw Sequence Listing."

[ ] 5. The computer readable form that has been filed with this application has been found to be damaged and/or unreadable as indicated on the attached CRF Diskette Problem Report. A Substitute computer readable form must be submitted as required by 37 C.F.R. 1.825(d).

[ ] 6. The paper copy of the "Sequence Listing" is not the same as the computer readable form of the "Sequence Listing" as required by 37 C.F.R. 1.821(e).

[ ] 7. Other:

8. **Applicant Must Provide:**

[x] An initial or substitute computer readable form (CRF) copy of the "Sequence Listing".

[x] An initial or substitute paper copy of the "Sequence Listing", as well as an amendment directing its entry into the specification.

[x] A statement that the content of the paper and computer readable copies are the same and, where applicable, include no new matter, as required by 37 C.F.R. 1.821(e) or 1.821(f) or 1.821(g).

For questions regarding compliance to these requirements, please contact:

- For Rules Interpretation, call (703) 308-4216 or (703) 308-2923
- For CRF Submission Help, call (703) 308-4212
- For PatentIn software Program Support:
  - HELP DESK: (703) 739-8559, ext 508, M-F, 8 AM to 5 PM EST except holidays
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